

$\Lambda(1670)$ 1/2 $I(J^P) = 0(\frac{1}{2}^-)$ Status: ***

The measurements of the mass, width, and elasticity published before 1974 are now obsolete and have been omitted. They were last listed in our 1982 edition Physics Letters **111B** 1 (1982).

 $\Lambda(1670)$ MASS

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
1660 to 1680 (≈ 1670) OUR ESTIMATE			
1677.5 \pm 0.8	¹ GARCIA-REC...03	DPWA	$\bar{K}N$ multichannel
1673 \pm 2	MANLEY 02	DPWA	$\bar{K}N$ multichannel
1670.8 \pm 1.7	KOISO 85	DPWA	$K^- p \rightarrow \Sigma \pi$
1667 \pm 5	GOPAL 80	DPWA	$\bar{K}N \rightarrow \bar{K}N$
1671 \pm 3	ALSTON-...	DPWA	$\bar{K}N \rightarrow \bar{K}N$
1670 \pm 5	GOPAL 77	DPWA	$\bar{K}N$ multichannel
1675 \pm 2	HEPP 76B	DPWA	$K^- N \rightarrow \Sigma \pi$
1679 \pm 1	KANE 74	DPWA	$K^- p \rightarrow \Sigma \pi$
1665 \pm 5	PREVOST 74	DPWA	$K^- N \rightarrow \Sigma(1385)\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
1668.9 \pm 2.0	ABAEV 96	DPWA	$K^- p \rightarrow \Lambda\eta$
1664	² MARTIN 77	DPWA	$\bar{K}N$ multichannel

 $\Lambda(1670)$ WIDTH

VALUE (MeV)	DOCUMENT ID	TECN	COMMENT
25 to 50 (≈ 35) OUR ESTIMATE			
29.2 \pm 1.4	¹ GARCIA-REC...03	DPWA	$\bar{K}N$ multichannel
23 \pm 6	MANLEY 02	DPWA	$\bar{K}N$ multichannel
34.1 \pm 3.7	KOISO 85	DPWA	$K^- p \rightarrow \Sigma \pi$
29 \pm 5	GOPAL 80	DPWA	$\bar{K}N \rightarrow \bar{K}N$
29 \pm 5	ALSTON-...	DPWA	$\bar{K}N \rightarrow \bar{K}N$
45 \pm 10	GOPAL 77	DPWA	$\bar{K}N$ multichannel
46 \pm 5	HEPP 76B	DPWA	$K^- N \rightarrow \Sigma \pi$
40 \pm 3	KANE 74	DPWA	$K^- p \rightarrow \Sigma \pi$
19 \pm 5	PREVOST 74	DPWA	$K^- N \rightarrow \Sigma(1385)\pi$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
21.1 \pm 3.6	ABAEV 96	DPWA	$K^- p \rightarrow \Lambda\eta$
12	² MARTIN 77	DPWA	$\bar{K}N$ multichannel

 $\Lambda(1670)$ DECAY MODES

Mode	Fraction (Γ_i/Γ)
$\Gamma_1 N\bar{K}$	20–30 %
$\Gamma_2 \Sigma\pi$	25–55 %
$\Gamma_3 \Lambda\eta$	10–25 %
$\Gamma_4 \Sigma(1385)\pi$	

The above branching fractions are our estimates, not fits or averages.

 $\Lambda(1670)$ BRANCHING RATIOS

See "Sign conventions for resonance couplings" in the Note on Λ and Σ Resonances.

$\Gamma(N\bar{K})/\Gamma_{\text{total}}$	DOCUMENT ID	TECN	Γ_1/Γ
0.20 to 0.30 OUR ESTIMATE			
0.37 \pm 0.07	MANLEY 02	DPWA	$\bar{K}N$ multichannel
0.18 \pm 0.03	GOPAL 80	DPWA	$\bar{K}N \rightarrow \bar{K}N$
0.17 \pm 0.03	ALSTON-...	DPWA	$\bar{K}N \rightarrow \bar{K}N$
• • • We do not use the following data for averages, fits, limits, etc. • • •			
0.20 \pm 0.03	GOPAL 77	DPWA	See GOPAL 80
0.15	² MARTIN 77	DPWA	$\bar{K}N$ multichannel

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$\Gamma(\Lambda\eta)/\Gamma_{\text{total}}$

VALUE	DOCUMENT ID	TECN	COMMENT	Γ_3/Γ
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• • • We do not use the following data for averages, fits, limits, etc. • • •

0.30±0.08 ABAEV 96 DPWA $K^- p \rightarrow \Lambda\eta$

 $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\bar{K} \rightarrow \Lambda(1670) \rightarrow \Sigma\pi$

VALUE	DOCUMENT ID	TECN	COMMENT	$(\Gamma_1\Gamma_2)^{1/2}/\Gamma$
-0.38±0.03	MANLEY 02	DPWA	$\bar{K}N$ multichannel	
-0.26±0.02	KOISO 85	DPWA	$K^- p \rightarrow \Sigma\pi$	
-0.31±0.03	GOPAL 77	DPWA	$\bar{K}N$ multichannel	
-0.29±0.03	HEPP 76B	DPWA	$K^- N \rightarrow \Sigma\pi$	
-0.23±0.03	LONDON 75	HLBC	$K^- p \rightarrow \Sigma^0\pi^0$	
-0.27±0.02	KANE 74	DPWA	$K^- p \rightarrow \Sigma\pi$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
-0.13	² MARTIN 77	DPWA	$\bar{K}N$ multichannel	

 $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\bar{K} \rightarrow \Lambda(1670) \rightarrow \Lambda\eta$

VALUE	DOCUMENT ID	TECN	COMMENT	$(\Gamma_1\Gamma_3)^{1/2}/\Gamma$
+0.24±0.04	MANLEY 02	DPWA	$\bar{K}N$ multichannel	
+0.20±0.05	BAXTER 73	DPWA	$K^- p \rightarrow \text{neutrals}$	
• • • We do not use the following data for averages, fits, limits, etc. • • •				
0.24	KIM 71	DPWA	K-matrix analysis	
0.26	ARMENTEROS69C	HBC		
0.20 or 0.23	BERLEY 65	HBC		

 $(\Gamma_i\Gamma_f)^{1/2}/\Gamma_{\text{total}} \text{ in } N\bar{K} \rightarrow \Lambda(1670) \rightarrow \Sigma(1385)\pi$

VALUE	DOCUMENT ID	TECN	COMMENT	$(\Gamma_1\Gamma_4)^{1/2}/\Gamma$
-0.17±0.06	MANLEY 02	DPWA	$\bar{K}N$ multichannel	
-0.18±0.05	PREVOST 74	DPWA	$K^- N \rightarrow \Sigma(1385)\pi$	

 $\Lambda(1670)$ FOOTNOTES

¹GARCIA-RECIO 03 gives pole, not Breit-Wigner, parameters, but the narrow width of the $\Lambda(1670)$ means there will be little difference.

²MARTIN 77 obtains identical resonance parameters from a T-matrix pole and from a Breit-Wigner fit.

 $\Lambda(1670)$ REFERENCES

GARCIA-REC... 03	PR D67 076009	C. Garcia-Recio <i>et al.</i>	(GRAN, VALE)
MANLEY 02	PRL 88 012002	D.M. Manley <i>et al.</i>	(BNL Crystal Ball Collab.)
ABAEV 96	PR C53 385	V.V. Abaev, B.M.K. Nefkens	(UCLA)
KOISO 85	NP A433 619	H. Koiso <i>et al.</i>	(TOKY, MASA)
PDG 82	PL 11B 1	M. Roos <i>et al.</i>	(HELS, CIT, CERN)
GOPAL 80	Toronto Conf. 159	G.P. Gopal	(RHEL) IJP
ALSTON-... 78	PR D18 182	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
Also	PRL 38 1007	M. Alston-Garnjost <i>et al.</i>	(LBL, MTHO+) IJP
GOPAL 77	NP B119 362	G.P. Gopal <i>et al.</i>	(LOIC, RHEL) IJP
MARTIN 77	NP B127 349	B.R. Martin, M.K. Pidcock, R.G. Moorhouse	(LOUC+) IJP
Also	NP B126 266	B.R. Martin, M.K. Pidcock	(LOUC) IJP
Also	NP B126 285	B.R. Martin, M.K. Pidcock	(LOUC) IJP
HEPP 76B	PL 65B 487	V. Hepp <i>et al.</i>	(CERN, HEIDH, MPIM) IJP
LONDON 75	NP B85 289	G.W. London <i>et al.</i>	(BNL, CERN, EPOL+) IJP
KANE 74	LBL-2452	D.F. Kane	(LBL) IJP
PREVOST 74	NP B69 246	J. Prevost <i>et al.</i>	(SACL, CERN, HEID) IJP
BAXTER 73	NP B67 125	D.F. Baxter <i>et al.</i>	(OXF) IJP
KIM 71	PRC 27 356	J.K. Kim	(HARV) IJP
Also	Duke Conf. 161	J.K. Kim	(HARV) IJP
	Hyperon Resonances, 1970		
ARMENTEROS 69C	Lund Paper 229	R. Armenteros <i>et al.</i>	(CERN, HEID, SACL) IJP
Values are quoted in LEVI-SETTI 69.		D. Berley <i>et al.</i>	(BNL) IJP
BERLEY 65	PRL 15 641		

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